

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-34. (Cancelled).

35. (Previously presented) A process for the production of an energy absorbing structural element, comprising:

supplying flat material to a mandrel, said flat material having reinforcing fibers embedded in a matrix;

winding said flat material on said mandrel in a single winding procedure to form a hollow body extending along an axis;

adapting a first end of said hollow body to interact with a fitting having a surface extending radially outward in relation to said axis so as to radially spread said first end of the hollow body in response to forces applied in the direction parallel to said axis on at least one of said first end and a second end of said hollow body which push said first end against said fitting;

said flat material configured to have at least some of said reinforcing fibers oriented in an azimuthal direction in relation to said axis when said flat material is wound to form said hollow body and to produce a layered structure having a different number of layers of the flat material in different areas of said hollow body;

said layered structure of said hollow body causing said forces to be absorbed by said hollow body without folding in such a manner that said forces generate cracks in said layered structure at said first end of said hollow body which cracks extend in said direction parallel to said axis and which propagate from said first end toward said second end.

36. (Withdrawn) A process as defined in claim 98, wherein the single piece of flat material has a section with a maximum width in said direction parallel to said axis and at least one section with a lesser width in said direction parallel to said axis.
37. (Withdrawn) A process as defined in claim 98, wherein the flat material is contoured in a section influencing the different areas having the different number of layers during the course of supplying the flat material to the mandrel.
38. (Withdrawn) A process as defined in claim 98, wherein the piece of flat material is contoured in the section influencing the different areas having the different number of layers prior to supplying the flat material to the mandrel.
39. (Withdrawn) A process as defined in claim 38, wherein the piece of flat material is contoured by means of a cutting procedure.
40. (Withdrawn) A process as defined in claim 37, wherein the piece of flat material is contoured by means of a cutting procedure.
41. (Withdrawn) A process as defined in claim 98, wherein a maximum extension of a contoured piece of flat material in said direction parallel to said axis corresponds to a maximum extension of the hollow body in said direction parallel to said axis.
42. (Previously presented) A process as defined in claim 35, wherein said flat material is comprised of multiple pieces of flat material which are supplied to the winding procedure in parallel.
43. (Currently amended) A process as defined in claim 42, wherein for the production of an energy absorbing structural element, comprising:
supplying flat material to a mandrel, said flat material having reinforcing fibers embedded in a matrix;

winding said flat material on said mandrel in a single winding procedure to form a hollow body extending along an axis;

adapting a first end of said hollow body to interact with a fitting having a surface extending radially outward in relation to said axis so as to radially spread said first end of the hollow body in response to forces applied in the direction parallel to said axis on at least one of said first end and a second end of said hollow body which push said first end against said fitting;

said flat material configured to have at least some of said reinforcing fibers oriented in an azimuthal direction in relation to said axis when said flat material is wound to form said hollow body and to produce a layered structure having a different number of layers of the flat material in different areas of said hollow body;

said layered structure of said hollow body causing said forces to be absorbed by said hollow body without folding in such a manner that said forces generate cracks in said layered structure at said first end of said hollow body which cracks extend in said direction parallel to said axis and which propagate from said first end toward said second end;

the flat material being comprised of multiple pieces of flat material which are supplied to the winding procedure in parallel; and

the multiple pieces of flat material are being supplied to the winding procedure as a connected arrangement of pieces of flat material in which said pieces of flat material are arranged in a sequence extending in said direction parallel to said axis.

44. (Previously presented) A process as defined in claim 43, wherein the multiple pieces of flat material are connected in a section which increases the number of layers in all the areas of the hollow body in an equal manner.

45. (Previously presented) A process as defined in claim 43, wherein the pieces of flat material are connected in a section with maximum width.

46. (Previously presented) A process as defined in claim 35, wherein the flat material is impregnated with the matrix material prior to the winding of the flat material to form the hollow body.

47. (Previously presented) A process as defined in claim 46, wherein the winding of the flat material is carried out with one of a liquid or a liquifiable matrix material.

48. (Previously presented) A process as defined in claim 47, wherein the matrix material is liquefied during the winding.

49. (Previously presented) A process as defined in claim 48, wherein the matrix material is kept at the melting temperature during the entire winding of the flat material.

50. (Previously presented) A process as defined in claim 49, wherein the matrix material is heated to the melting temperature during the winding of the flat material.

51. (Previously presented) A process as defined in claim 49, wherein the matrix material is heated to the melting temperature by means of the mandrel which is heated and kept at the melting temperature.

52. (Previously presented) A process as defined in claim 48, wherein the matrix material is heated to the melting temperature by means of the mandrel which is heated and kept at the melting temperature.

53. (Previously presented) A process as defined in claim 52, wherein the mandrel is heated to the melting temperature of the matrix material prior to the winding.

54. (Previously presented) A process as defined in claim 53, wherein the mandrel is heated to the melting temperature of the matrix material prior to insertion into a winding device.

55. (Previously presented) A process as defined in claim 35, wherein the matrix material is heated to such an extent that it is adequately liquefied during the winding of the flat material.

56. (Previously presented) A process as defined in claim 55, wherein the matrix material is hardened in the hollow body following the winding.

57. (Previously presented) A process as defined in claim 56, wherein the matrix material is hardened with the hollow body seated on a winding tube.

58. (Previously presented) A process as defined in claim 56, wherein one or more mandrels are each wound with a hollow body and are combined during the hardening of the matrix material to form groups of mandrels passing together through the hardening phase.

59. (Previously presented) A process as defined in claim 58, wherein the hollow bodies are cooled when seated on the mandrels.

60. (Previously presented) A process as defined in claim 59, wherein the hollow bodies are withdrawn from the mandrels.

61. (Previously presented) A process as defined in claim 60, wherein the hollow bodies, which are connected, are separated prior to the withdrawal from the mandrels.

62. (Previously presented) A process as defined in claim 59, wherein the hollow bodies, which are connected, are separated following the withdrawal from the mandrels.

63. (Previously presented) A process in accordance with claim 35, wherein said hollow body end comprises one of a chamfered end or triggering slits.

64. (Previously presented) A process in accordance with claim 35, wherein the surface of said fitting is toroidal in shape.

65. (Previously presented) A process in accordance with claim 35, wherein said number of layers of said flat material progressively vary from one end of said hollow body to the other end of said hollow body.

66. (Previously presented) A process in accordance with claim 35:

wherein said flat material comprises multiple pieces of flat material.

67. (Previously presented) A process as defined in claim 66, wherein at least one of the pieces of flat material has a section with a maximum width in said direction parallel to said axis and at least one section with a lesser width in said direction parallel to said axis.

68. (Previously presented) A process as defined in claim 66, wherein the pieces of flat material are contoured in a section influencing the different areas having the different number of layers during the course of supplying the flat material to the mandrel.

69. (Previously presented) A process as defined in claim 66, wherein the pieces of flat material are contoured in the section influencing the different areas having the different number of layers prior to supplying the flat material to the mandrel.

70. (Previously presented) A process as defined in claim 66, wherein the pieces of flat material are contoured by means of a cutting procedure.

71. (Previously presented) A process as defined in claim 66, wherein a maximum extension of a contoured piece of flat material in said direction parallel to said axis corresponds to a maximum extension of the hollow body in the direction parallel to said axis.

72. (Previously presented) A process as defined in claim 66, wherein the multiple pieces of flat material are supplied to the winding procedure in parallel.

73. (Currently amended) A process ~~as defined in claim 72, wherein for the production of an energy absorbing structural element, comprising:~~

supplying flat material to a mandrel, said flat material having reinforcing fibers embedded in a matrix;

winding said flat material on said mandrel in a single winding procedure to form a hollow body extending along an axis;

adapting a first end of said hollow body to interact with a fitting having a surface extending radially outward in relation to said axis so as to radially spread said first end of the hollow body in response to forces applied in the direction parallel to said axis on at least one of said first end and a second end of said hollow body which push said first end against said fitting;

said flat material configured to have at least some of said reinforcing fibers oriented in an azimuthal direction in relation to said axis when said flat material being wound to form said hollow body and to produce a layered structure;

said layered structure of said hollow body causing said forces to be absorbed by said hollow body without folding in such a manner that said forces generate cracks in said layered structure at said first end of said hollow body which cracks extend in said direction parallel to said axis and which propagate from said first end toward said second end;

the flat material being comprised of multiple pieces of flat material;

the multiple pieces of flat material being supplied to the winding procedure in parallel; and

the multiple pieces of flat material are being supplied to the winding procedure as a connected arrangement of pieces of flat material in which said pieces of flat material are arranged in a sequence extending in said direction parallel to said axis.

74. (Previously presented) A process as defined in claim 73, wherein the multiple pieces of flat material are connected in a section which increases the number of layers in all the areas of the hollow body in an equal manner.

75. (Previously presented) A process as defined in claim 73, wherein the multiple pieces of flat material are connected in a section with maximum width.

76. (Previously presented) A process as defined in claim 66, wherein the matrix material is hardened in the hollow body following the winding.

77. (Previously presented) A process in accordance with claim 66, wherein said hollow body end comprises one of a chamfered end or triggering slits.

78. (Previously presented) A process in accordance with claim 66, wherein the surface of said fitting is toroidal in shape.

79. (Withdrawn) A process for absorbing energy in a structural element, comprising:
providing a hollow body extending along an axis, said hollow body comprising:
 a single piece of flat material having reinforcing fibers embedded in a matrix material wound on a mandrel in a single winding procedure to form a hollow body extending along an axis;
 said flat material configured to have at least some of said reinforcing fibers oriented in an azimuthal direction in relation to said axis when said flat material is wound to form said hollow body and to produce a layered structure having a different number of layers of the flat material in different areas of said hollow body;
providing a fitting for interaction with a first end of said hollow body, said fitting having a surface extending radially outward in relation to said axis;
absorbing forces applied on at least one of said first end and a second end of said hollow body in the direction parallel to said axis, which forces push said first end against said

fitting, said forces being absorbed by radially spreading of said first end of the hollow body in response to said forces, said radial spreading generating cracks at said first end of said hollow body, which cracks extend in said direction parallel to said axis and which propagate through the layered structure of the hollow body from said first end toward said second end;

 said layered structure of said hollow body causing said forces to be absorbed by said hollow body without folding.

80. (Withdrawn) A process in accordance with claim 79, wherein said number of layers of said flat material progressively vary from one end of said hollow body to the other end of said hollow body.

81. (Withdrawn) A process as defined in claim 79, wherein the single piece of flat material has a section with a maximum width in said direction parallel to said axis and at least one section with a lesser width in said direction parallel to said axis.

82. (Withdrawn) A process as defined in claim 79, wherein the flat material is contoured in a section influencing the different areas having the different number of layers during the course of supplying the flat material to the mandrel.

83. (Withdrawn) A process as defined in claim 79, wherein the flat material is contoured in the section influencing the different areas having the different number of layers prior to supplying the flat material to the mandrel.

84. (Withdrawn) A process as defined in claim 79, wherein the piece of flat material is contoured by means of a cutting procedure.

85. (Withdrawn) A process as defined in claim 79, wherein a maximum extension of a contoured piece of flat material in said direction parallel to said axis corresponds to a maximum extension of the hollow body in the direction parallel to said axis.

86. (Withdrawn) A process as defined in claim 79, wherein multiple pieces of flat material are supplied to the winding procedure in parallel.

87. (Withdrawn) A process as defined in claim 86, wherein the multiple pieces of flat material are supplied to the winding procedure as a connected arrangement of pieces of flat material in which said pieces of flat material are arranged in a sequence extending in said direction parallel to said axis.

88. (Withdrawn) A process as defined in claim 87, wherein the multiple pieces of flat material are connected in a section which increases the number of layers in all the areas of the hollow body in an equal manner.

89. (Withdrawn) A process as defined in claim 87, wherein the multiple pieces of flat material are connected in a section with maximum width.

90. (Withdrawn) A process as defined in claim 79, wherein the matrix material is hardened in the hollow body following the winding.

91. (Withdrawn) A process in accordance with claim 79, wherein said hollow body end comprises one of a chamfered end or triggering slits.

92. (Withdrawn) A process in accordance with claim 79, wherein the surface of said fitting is toroidal in shape.

93. (Currently amended) A process ~~in accordance with claim 66, wherein:~~ for the production of an energy absorbing structural element, comprising:
supplying flat material to a mandrel, said flat material having reinforcing fibers embedded in a matrix;

winding said flat material on said mandrel in a single winding procedure to form a hollow body extending along an axis;

adapting a first end of said hollow body to interact with a fitting having a surface extending radially outward in relation to said axis so as to radially spread said first end of the hollow body in response to forces applied in the direction parallel to said axis on at least one of said first end and a second end of said hollow body which push said first end against said fitting;

said flat material configured to have at least some of said reinforcing fibers oriented in an azimuthal direction in relation to said axis when said flat material is wound to form said hollow body and to produce a layered structure;

said layered structure of said hollow body causing said forces to be absorbed by said hollow body without folding in such a manner that said forces generate cracks in said layered structure at said first end of said hollow body which cracks extend in said direction parallel to said axis and which propagate from said first end toward said second end;

the flat material being comprised of multiple pieces of flat material;

said mandrel has having an axis of rotation;

said multiple pieces of flat material comprise comprising an arrangement of a sequence of single pieces of flat material connected to each other;

said sequence of single pieces of flat material extending parallel to said axis of rotation of said mandrel;

said sequence of single pieces of flat material is being wound on said mandrel in a single winding procedure to form a plurality of hollow bodies extending along said axis of rotation of said mandrel, each of said hollow bodies being produced by winding one of said single pieces of flat material;

each single piece of flat material is being contoured in such a manner that said single winding procedure produces a different number of layers of the flat material in different areas of each of said hollow bodies and that said different number of layers of said flat material in each of said hollow bodies provides a characteristic absorption of

energy if forces applied in a direction parallel to said axis on at least one of a first and second end of said hollow body are absorbed by said hollow body with the generation of cracks extending through said different areas of said hollow body.

94. (Previously presented) A process as defined in claim 93, wherein the multiple pieces of flat material are connected in a section of said single pieces of flat material which increases the number of layers in all the areas of the hollow body in an equal manner.

95. (Previously presented) A process as defined in claim 93, wherein the multiple pieces of flat material are connected in a section of said single pieces of flat material with maximum width.

96. (Previously presented) A process as defined in claim 93, wherein a first sequence of single pieces of flat material is used in one production step for a first plurality of energy absorbing structural elements and a second sequence of single pieces of flat material is used in the next production step for a second plurality of energy absorbing structural elements, said second sequence of single pieces of flat material having a shape which is complementary to the shape of the first sequence of single pieces of flat material.

97. (Previously presented) A process as defined in claim 93, wherein said hollow bodies in said plurality of hollow bodies are connected to each other and are separated from each other in a cutting step.

98. (Withdrawn) A process as defined in claim 35, wherein said flat material comprises a single piece of flat material.

99. (New) A process for the production of an energy absorbing structural element, comprising:

supplying flat material to a mandrel, said flat material having reinforcing fibers embedded in a matrix;

winding said flat material on said mandrel in a single winding procedure to form a hollow body extending along an axis;

adapting a first end of said hollow body to interact with a fitting having a surface extending radially outward in relation to said axis so as to radially spread said first end of the hollow body in response to forces applied in the direction parallel to said axis on at least one of said first end and a second end of said hollow body which push said first end against said fitting;

said flat material configured to have at least some of said reinforcing fibers oriented in an azimuthal direction in relation to said axis when said flat material is wound to form said hollow body and to produce a layered structure;

said layered structure of said hollow body causing said forces to be absorbed by said hollow body without folding in such a manner that said forces generate cracks in said layered structure at said first end of said hollow body which cracks extend in said direction parallel to said axis and which propagate from said first end toward said second end;

the flat material being comprised of multiple pieces of flat material;

said mandrel having an axis of rotation;

said multiple pieces of flat material comprising an arrangement of a sequence of single pieces of flat material connected to each other;

said sequence of single pieces of flat material extending parallel to said axis of rotation of said mandrel;

said sequence of single pieces of flat material being wound on said mandrel in a single winding procedure to form a plurality of hollow bodies extending along said axis of rotation of said mandrel, each of said hollow bodies being produced by winding one of said single pieces of flat material;

each single piece of flat material being contoured in such a manner that said single winding procedure produces said hollow bodies with a number of layers and that said number of layers of said flat material in each of said hollow bodies provides a characteristic absorption of energy if forces applied in a direction parallel to said axis on

at least one of a first and second end of said hollow body are absorbed by said hollow body with the generation of cracks extending through said hollow body.